

TULAREMIA

**Report Immediately
by phone**
If bioterrorism suspected

Potential Bioterrorism Agent: Category A

Also known as: Rabbit Fever, Deer Fly Fever

Responsibilities:

Lab: Report immediately by phone if bioterrorism suspected, otherwise weekly

Physician: Report immediately by phone if bioterrorism suspected, otherwise weekly

Local Public Health Agency (LPHA): Report immediately by phone if bioterrorism suspected.

Local Public Health Agency (LPHA): Follow-up required. Iowa Department of Public Health will lead the follow-up investigation.

Iowa Department of Public Health

Disease Reporting Hotline: (800) 362-2736

Secure Fax: (515) 281-5698

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Agent

Francisella tularensis is a gram-negative bacterium. Two types occur in the United States: Type A is biovar tularensis and Type B is biovar palaeoarctica. Type A is more virulent than Type B and has a lower infective dose.

B. Clinical Description

Symptoms: There are at least six types of clinical symptoms, depending on the route of infection and the strain of bacteria present. Nearly all cases have a rapid onset of fever. If bacteremia develops it may last for two weeks in untreated cases. Lesions may contain the bacteria for a month. The most common categories of illness are as follows:

Ulceroglandular: Patients have large, tender lymph nodes and a non-healing skin ulcer at the site of infection, often with fatigue, chills, and malaise.

Glandular: Patients have one or more enlarged painful nodes that may be filled with purulent exudate.

Pneumonic (pulmonary): This may be a primary infection following inhalation of the organisms or secondary to bacteremia; plague-like symptoms that may include a non-productive cough, difficulty breathing and chest pain. Patchy infiltrates may be seen on the chest X-ray.

Typhoidal: This is a rare form, with enlarged and inflamed mesenteric lymph nodes, septicemia, abdominal pain, diarrhea, vomiting and gastrointestinal bleeding.

Oropharyngeal: This form results from ingestion of bacteria in food or water leading to painful pharyngitis, abdominal pain, diarrhea, and vomiting.

Oculoglandular: Patients have painful, purulent conjunctivitis with enlarged lymph nodes of the neck or near the ears and usually accompanied with fever, chills and malaise.

Onset: Most cases have a rapid onset of fever. Symptoms usually appear 3 to 5 days after exposure to the bacteria, but can take as long as 14 days.

Complications: The case fatality of type A tularemia is 5% - 15% if untreated. The case fatality rate in pneumonic or primary septicemia is 30 to 60% if untreated. Pneumonia may complicate all clinical types of tularemia and requires prompt identification and specific treatment to prevent fatal outcomes.

C. Reservoirs

Common reservoirs: Type A infections are acquired from rabbits or *Derma-centor* ticks, including the common dog tick or wood tick.

Less common reservoirs: Type B infection is associated with a wide variety of mammalian hosts: rabbits, hares, and some rodents such as beavers and muskrats are particularly important. Ticks, mosquitoes, and deer flies may serve as vectors for the disease. Humans, however, do not usually transmit the infection to others.

D. Modes of Transmission

Spread: Tularemia may have the most varied modes of spread of any bacterial agent.

- Direct Contact: This can occur when skinning or dressing game.
- Arthropod Vector: The bacteria may be spread by the bite of tick, either *Derma-centor andersoni* (wood tick) or *D. variabilis* (dog tick) or amblyomma americana (lone star tick) or a bite from deer flies or horse flies.
- Ingestion: Through contaminated food such as undercooked rabbit meat or drinking contaminated water.
- Inhalation: Infectious aerosols can be generated when handling animal carcasses or cleaning areas where there may be dried rodent carcasses, running over a rabbit's nest with the lawn mower, or from the dust generated while moving contaminated hay, grain or soil.
- No direct person-to-person transmission

Survival of Organism: *Francisella tularensis* can survive for weeks to months in cool water or mud, for up to 3 months in tap water and in dry straw for as long as 6 months. Routine water purification is very effective at killing *F. tularensis*.

E. Incubation period

The incubation period ranges from 1 - 14 days, but is usually 3 - 5 days.

F. Period of Communicability or Infectious Period

The infectious agent may be found in the blood of untreated patients during the first two weeks of disease and in lesions for a month or more. Flies can remain infective for 14 days after infection and ticks through their lifetime. Rabbit meat frozen at 5° F can remain infective for over three years.

G. Epidemiology

Tularemia is found throughout North America and in many parts of continental Europe, Russia, China and Japan. In the United States, it occurs all months of the year. It is a risk for hunters during the fall and early winter, for lawn care workers in the summer when mowing over rabbits, providing an aerosol, and in spring in summer for children when ticks and flies are most prevalent. Type A tularemia is found only in North America where it is common in rabbits and is transmitted by a tick bite. Type B strains in North America are found in mammals other than rabbits.

H. Bioterrorism Potential

Category A: *Francisella tularensis* is considered a possible weapon of bioterrorism. If the organism were effectively disseminated it could cause a serious challenge to limit the numbers of casualties and to control other repercussions of an attack.

2) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To determine cases and clusters of cases that could be associated with a bioterrorism event
- To focus prevention and control efforts
- To determine whether a source of infection may be a public health concern

B. Laboratory and Healthcare Provider Reporting Requirements

Tularemia requires immediate reporting if the provider reasonably believes or suspects that that *Francisella tularensis* infection may be the result of a deliberate act of terrorism.

Tularemia is also reportable if it is a cause or suspected cause of an outbreak, which would be an uncommon situation given its usual modes of spread.

Laboratory Testing Services Available

The University of Iowa State Hygienic Laboratory (SHL) provides services for testing clinical specimens for *Francisella tularensis* and for confirmation of isolates from sentinel laboratories. Sentinel laboratories can send specimens (blood, tissue biopsies, discharge fluid, vesicle fluid, etc.) to SHL. Isolates submitted from other laboratories will be confirmed and/or identified. Additionally, all laboratories are asked to submit all isolates cultured for further identification to aid in the public health surveillance and necessary to prevent the spread of this disease. SHL must be contacted before samples are submitted for safety purposes. For more information on submitting samples, contact SHL at 319-335-4500, or visit: www.shl.uiowa.edu/

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider must report. The preferred method of reporting a case that is NOT SUSPECTED of being related to bioterrorism is by utilizing the Iowa Disease Surveillance System (IDSS). However, if IDSS is not available, the reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736; fax number (515) 281-5698.

C. Local Public Health Agency Follow-up Responsibilities

Case Investigation: Investigation of cases is directed by the Iowa Department of Public Health Center for Acute Disease Epidemiology (CADE). The cooperation of local public health agencies, laboratories, and medical providers is requested.

3) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

Standard Precautions. Quarantine is not required.

B. Protection of Contacts of a Case

No prophylaxis for contacts to a case is necessary. Standard Precautions for inpatients with a draining lesion or for pulmonary symptoms should be used.

C. Managing Special Situations

Reported Incidence Is Higher than Usual/Outbreak Suspected

If an outbreak is suspected, it should be reported immediately due to seriousness of illness and potential of intentional infection.

Exposure of a Laboratory Worker

Requires immediate reporting so prophylactic treatment may be implemented.

D. Preventive Measures

Environmental Measures

In general, environmental measures are unnecessary. If contaminated water or food or agricultural materials are suspected, action should be taken in consultation with the Center for Acute Disease Epidemiology.

Preventive Measures/Education

- Hunters should wear gloves when skinning wild game, keep their hands/gloves away from their eyes and thoroughly wash their hands after handling wild game carcasses. Wild game meat should be cooked "well done" (to at least 150° F/65° C).
- Drink only treated water when in wilderness areas to avoid bacterial and protozoan diseases that can be transmitted via surface water.
- Use DEET-based insect repellents to reduce the possibility of fly or tick bites. Use insect repellants properly. Repellants that contain DEET (N,N-diethyl-*m*-toluamide) should be used in concentrations no higher than 15% for children and 30% for adults. Avoid overuse of DEET-based products; excess application can lead to adverse reactions. Remember, repellants should *never* be used on infants. Permethrin is a repellent that can only be applied onto clothing, *not* exposed skin.
- Avoid tick-infested areas. In areas where contact with ticks may occur, individuals should be advised of the following:
 - Wear long-sleeved shirts and long, light-colored pants tucked into socks or boots.
 - Stay on trails when walking or hiking and try to avoid high grass.
 - After each day spent in tick-infested areas, check yourself, your children, and your pets for ticks. Parts of the body ticks like most include the back of the knee, armpit, scalp, groin, and back of the neck.
 - Promptly remove any attached tick using fine-point tweezers. The tick should not be squeezed or twisted, but grasped close to the skin and pulled straight out with steady pressure. Once removed, the tick should be drowned in rubbing alcohol or the toilet.
- Notify laboratories when sending in specimens for possible cases are sent in for testing.

4) ADDITIONAL INFORMATION

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for Tularemia can be found at: www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

References

American Academy of Pediatrics. *2003 Red Book: Report of the Committee on Infectious Diseases, 26th Edition*. Illinois, American Academy of Pediatrics, 2003.
CDC website: Tularemia at www.cdc.gov/Tularemia/

Heymann, D.L., ed. *Control of Communicable Diseases Manual, 20th Edition*. Washington, DC, American Public Health Association, 2015.

Additional Resources

www.bt.cdc.gov/agent/tularemia/